

# **ITS Field Operational Test Summary**

## **Dynamic Downhill Truck Speed Warning System**

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### **Introduction**

The Dynamic Downhill Truck Speed Warning System (DTSW) ITS Field Operational Test is a Commercial Vehicle Operations test that evaluates a driver advisory system for long, steep downgrades. The system operates by automatically weighing and classifying trucks as they approach a long downhill section of highway. Considering the weight and class of the truck, the system calculates a safe descent speed. Each truck receives a vehicle-specific, recommended safe speed message on a variable message sign. The project seeks to affect commercial vehicle driver behavior by providing vehicle-specific, safe downhill speed messages.

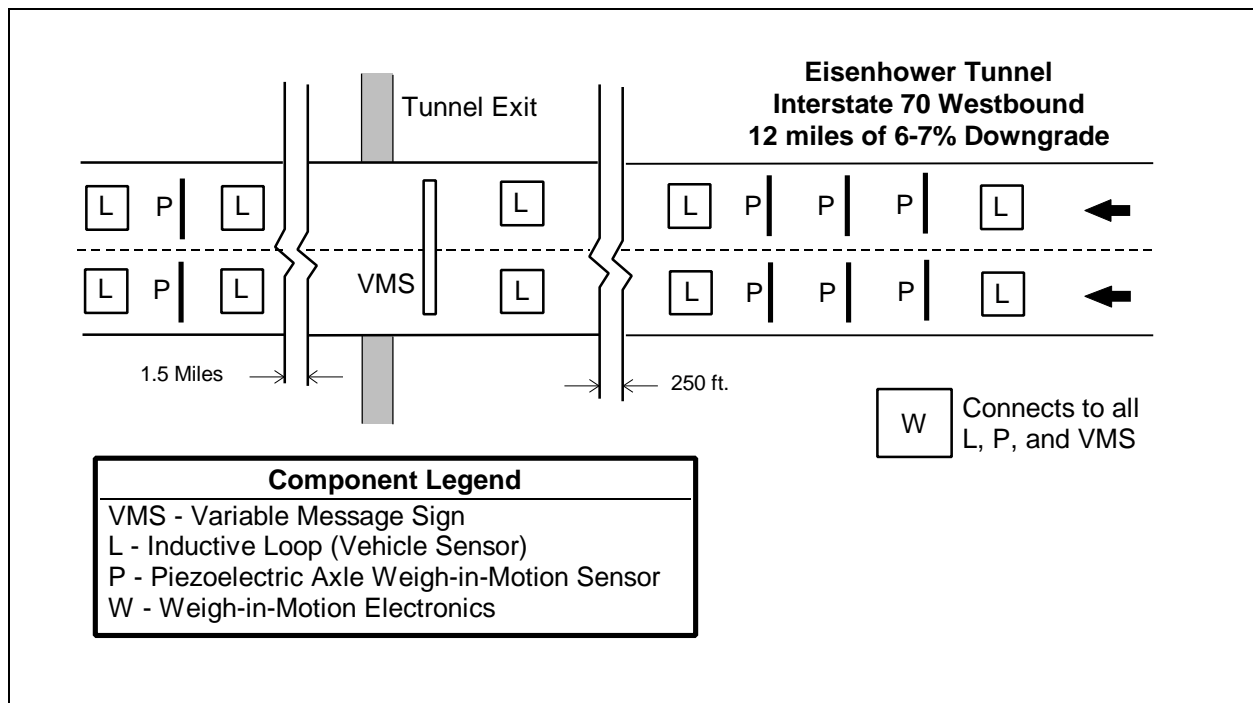
The system began operation in mid-1995 on Interstate 70 west of the Eisenhower Tunnel in Colorado. Beginning July 1997 the system was reconstructed and relocated inside the Eisenhower Tunnel just before the tunnel exit. During and after reconstruction baseline truck speed data was collected for use in the evaluation.

### **Project Description**

The Colorado Department of Transportation proposed the "Dynamic Truck Speed Warning System for Long Downgrades" in October 1992. Their proposal cited several disturbing statistics about past truck accidents on steep downgrades on Colorado highways. These statistics established the need to demonstrate existing technology that might reduce the frequency and severity of downgrade truck accidents.

The DTSW system consists of inductive loops that trigger the weigh in motion (WIM) sensors, variable message signs (VMS), and computer hardware and software. Figure 1 presents a schematic of the DTSW system components. The system identifies commercial vehicles and determines their weight, classification and speed. Using a Federal Highway Administration algorithm, the system calculates a recommended speed and presents it to the driver on a VMS. It is hoped that the drivers will heed the speed warning. Following the recommended speed would reduce or prevent runaway truck accidents or use of the two runaway truck ramps farther down the 7 percent grade.

The VMS displaying the advised speed is 250 feet beyond the loop detectors and WIM strips. Thus, a trucker traveling 40 mph (posted truck speed is 30 mph) has about 4 seconds to read the speed message. The DTSW system is positioned at the top of the grade inside the tunnel so that truckers receive the advice before building up speed on the downgrade. A second set of loop detectors and WIM strips are located on the downgrade 1.5 miles beyond the tunnel exit. Both sets of loops and WIM strips record each vehicle's time of passage, configuration, speed and weight. This information is generally sufficient to identify each truck and cross-reference the data from both stations.



**Figure 1: Schematic of DTSW System**

The evaluation of the system focuses on two principal areas of concern, technical performance and driver impact. The technical performance evaluation will assess the accuracy of the system in measuring truck weight, speed, and type and the reliability of the system in providing the correct message to the correct truck. This evaluation will also assess the durability of the system as determined by system downtime during the study period. Driver impacts will assess driver awareness, based on driver interviews, and driver compliance, based on speeds measured at the tunnel exit and 1.5 miles downhill.

### Test Status

In conjunction with a highway repaving project, the entire DTSW system was relocated from a position just outside the Eisenhower Tunnel to just inside it. Reinstallation was completed December 1997. An evaluation report is expected May 1998.

### Test Partners

Colorado Department of Transportation

Colorado Department of Public Safety

Federal Highway Administration

University of Colorado at Denver

International Road Dynamics.

### References

None published.